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# ENTOMOLOGICAL NEWS

**NOVEMBER 1955**

**Vol. LXVI** **No. 9**

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# ENTOMOLOGICAL NEWS

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## Grasshoppers (Acrididae) and Caterpillars (Arctiidae) Impaled on Thorns by Shrikes in the Vicinity of London, Ontario

By W. W. JUDD, Department of Zoology, University of Western Ontario, London, Ontario

About one mile north of London, Ontario, in London Township, there is an area of low ground which borders tributary streams of the Thames River and supports a rank growth of weeds and grasses. Many hawthorn trees, *Crataegus* spp., ranging from two to fifteen feet in height, grow in this area and interspersed among them are a few small wild apple trees. On November 28, 1954, when walking through this area, the writer found six grasshoppers impaled on the thorns of the hawthorn trees and on small stubs on the twigs of the apple trees. Not enough snow had fallen during the previous days of autumn to leave any trace of snow on the ground. On December 4, after a light covering of snow had lain on the ground for four days, a second examination of the trees was made and twenty more insects, 18 grasshoppers and 2 caterpillars, were found impaled (figs. 1–5). Twenty-two of the insects found on the two days were located in separate trees, from one to six feet from the ground. Two hawthorn trees bore two grasshoppers each, impaled on their thorns.

The grasshoppers were identified in Blatchley's key (1926) as the Clouded Locust, *Encoptolophus sordidus* (Burmeister) (1 ♂, 15 ♀♀), and the Red-legged Locust, *Melanoplus femur-rubrum* (DeGeer) (8 ♀♀), and the two caterpillars were identified in Peterson's key (1948) as larvae of the family Arctiidae. The caterpillars were black with white longitudinal stripes, two

dorso-lateral and two lateral, and the body bore several large verrucae covered with long setae. One caterpillar (fig. 5) was impaled on a thorn through its third abdominal segment and the other through its fourth abdominal segment. Four of the grasshoppers were impaled or jammed over short stubs along the twigs of apple trees. Three of these were impaled through the thorax and one was jammed over the stub in such a way that the stub penetrated beneath the pronotum (fig. 1). The other 20 grasshoppers were stuck through the thorax on thorns of the hawthorns, some having been penetrated only by the tip of the thorn (fig. 4), some having been forced part way down the length of the thorn (fig. 3) and others forced down to the base of the thorn (fig. 2). *E. sordidus* and *M. femur-rubrum* are species that occur commonly in southern Ontario (Walker, 1902) and remain active well toward the end of autumn (Blatchley, 1926; Cantrall, 1943) provided the weather is favourable. Some arctiid caterpillars also habitually remain active well into the fall before hibernating.

At no time during the investigation were any birds or animals seen near the insects in the trees but these insects were doubtless put there by shrikes, for it is well known that shrikes impale their prey on convenient supports (Bent, 1950). The two shrikes that occur in the vicinity of London are the Migrant Shrike, *Lanius ludovicianus,* and the Northern Shrike, *L. excubitor* (Saunders and Dale, 1933). The migrant shrike spends the summer and nests in the vicinity of London and migrates southward in the fall, while the northern shrike dwells in northern Ontario during the summer and migrates southward to the vicinity of London in the fall and winter.

Information on the status of these two shrikes in the vicinity of London is available in the minutes of the McIlwraith Ornithological Club, deposited in the Williams Memorial Library, London; also in reports of the Christmas census conducted by the Club since 1909; and in two published lists of the dates of the arrival of birds after the first of the year (Anon., 1919, 1927). These two latter lists (Anon., 1919, 1927), based on records extending back as far as 1879, show that the earliest

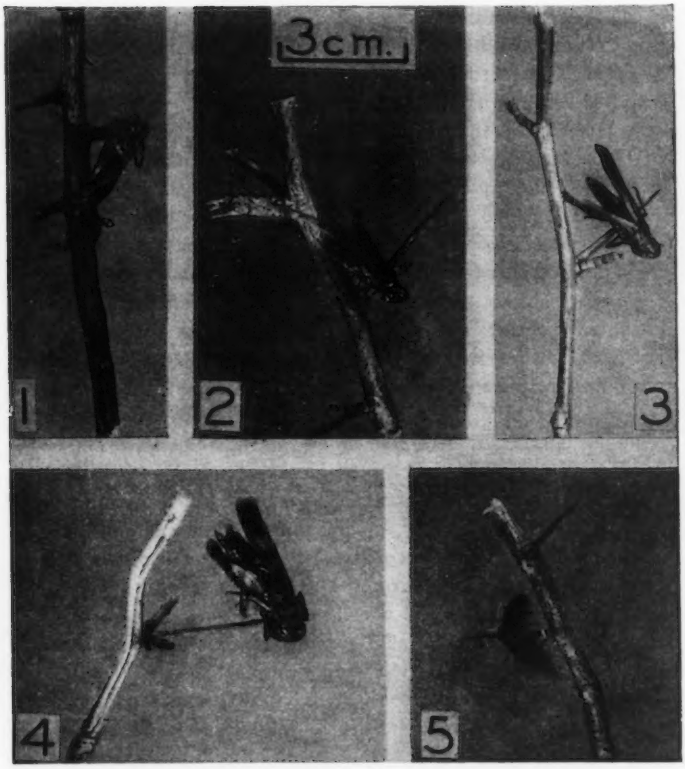


FIG. 1. *Melanoplus femur-rubrum*, ♀, on apple stub.
FIG. 2. *Melanoplus femur-rubrum*, ♀, on thorn of hawthorn.
FIG. 3. *Encoptolophus sordidus*, ♀, on thorn of hawthorn.
FIG. 4. *Encoptolophus sordidus*, ♀, on thorn of hawthorn.
FIG. 5. Caterpillar (Arctiidae), on thorn of hawthorn.

date of arrival of the migrant shrike in spring is March 15 (recorded in 1911) and that the average date of arrival is April 10 (Anon., 1919), later recorded as April 3 (Anon., 1927). A late date of fall departure of this species from southern Ontario, as recorded by Bent (1950), is October 18. It has never been recorded at London during the Christmas census.

Records extending back to 1893 show the earliest record of appearance in fall of the northern shrike in the vicinity of London as October 24 (in 1921) and it has been seen in other years as early as October 28, November 7, 17 and 18. It has been included in the list of birds seen in the Christmas census in 13 of the years between 1909 and 1954 and the latest record of its remaining in the vicinity of London in the spring is March 31 (in 1893).

Both the migrant and the northern shrikes habitually impale their prey on thorns and either one could have been responsible for the presence of the caterpillars and grasshoppers in the trees as noted by the present writer. However, it is likely that northern shrikes were responsible, for the insects were in a good state of preservation and had evidently been only recently caught. The mild fall of 1954, in which persistent snow had occurred only after December 1, would no doubt have allowed the insects to remain active well into November. It is also a matter of record that northern shrikes were exceptionally abundant in the vicinity of London during the winters of 1953–54 and 1954–55. The records of the Christmas census show only one or two shrikes counted in the census from 1912 to 1937, none during the period 1938 to 1952 and 7 in each of the censuses of 1953 and 1954. During January and February, 1954 the writer (Judd, 1954) found several prairie deer mice suspended in hawthorn trees in the same locality as that in which the insects were found in the fall of 1954. It has been noted by several authors (e.g., Davis, 1937, 1949 and Floyd, 1928) that the northern shrike occurs over its winter range in cycles of abundance and scarcity. Davis (1937), using data compiled in censuses from 1900 to 1936, concluded that the cycle was 4.2 years. The same author (Davis, 1949), using data from the years 1930 to 1948, concluded that large southward emigrations of northern shrikes occur at intervals of five or six years.

Several authors, including Judd (1898), Knowlton and Harmston (1944), Bent (1950), Floyd (1928) and Montagna (1939), have studied the food of shrikes and have noted that they feed on mice, birds, lizards and a considerable variety of

insects. Knowlton and Harmston (1944) found grasshoppers and cutworm larvae among the stomach contents of shrikes in Utah. Judd (1898) concluded that insects amounted to 40 per cent of the food of the northern shrike and that grasshoppers constituted one-fourth of its total food supply. He further attributed this large proportion of grasshoppers in the shrike's food to the fact that active insects, such as flying grasshoppers, are more liable to be caught than sluggish ones; and he noted that arctiid caterpillars are included in the diet "for even the bristly Isabella caterpillar is eaten, an object apparently as edible as a chestnut bur."

## Acknowledgment

The writer is grateful to Mr. A. Gage, Senior Technician, Department of Zoology, University of Western Ontario, for preparing photographs of the insects and to Mr. J. Leach, Migration Secretary, McIlwraith Ornithological Club, for making available records of the occurrence of shrikes in the vicinity of London.

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# Notes on the Synonymy, Distribution and Affinities of the Subfamily Fedtschenkiinae of the Sapygidae (Hymenoptera)

By J. Chester Bradley

In the spring of 1928, while in Vienna, I had the opportunity to study specimens of *Fedtschenkia grossa* in the Natural History Museum of that city. It was at once apparent that they are identical generically with the Californian *Telephoromyia anthracina* of Ashmead. I had collected several specimens of this insect, including both sexes, in California in 1907, and had long known it to be a sapygid, instead of a thynnid as supposed by Ashmead.

Dr. V. S. L. Pate [1] has discussed the uncertainty surrounding the taxonomic position of *Fedtschenkia.* This uncertainty can only be explained by the fact that the Hymenopterists referred to (with the exception of Handlirsch) can never have seen actual specimens, or they would have at once recognized them as Sapygidae. The specimens in Vienna were standing under the family label Sapygidae, presumably placed there by Kohl.

At that time I wrote a manuscript synonymizing *Telephoromyia* with *Fedtschenkia,* and detailing the characters which agree with *Sapyga,* as well as those which differ. I proposed the then new subfamily Feltschenkiinae and said "The fossorial legs of *Fedtschenkia* leave little doubt as to the nature of its habits, and necessitate a revision of our ideas of the habits of Sapygidae, which can hereafter be looked upon as only in part parasitic. But that *Fedtschenkia* represents the type of insect from which the Sapygidae, as hitherto known, have descended can hardly be doubted. It seems to afford a very satisfactory anchoring place for the Sapygidae, the exact affinities of which have always been somewhat puzzling. Outside of the Sapygidae the genus *Fetschenkia* seems to have its closest affinities in anthoboscid fossorial forms, such as *Anthobosca chilensis,* and while it is in many respects remote from that insect, I cannot

[1] Neotropical Sapygidae, with a conspectus of the family. . . . Acta zoologica lilloana del Instituto "Miguel Millo," 1947, 4: 393–426.

doubt that its origin, and with it the family Sapygidae, lies close to the very primitive family Anthoboscidae."

The discontinuous distribution of *Fedtschenkia* (Turkestan and sonoran North America) is shared with other very primitive insects, for example *Crioscolia* Bradley, a subgenus of *Campsoscolia* Betrem, most primitive of Scoliidae.

My views on the identity of *Telephoromyia* and the position of *Fedtschenkia* became somewhat a matter of common knowledge amongst American hymenopterists, and in 1933 Mr. Richard Dow sent me a brief manuscript to be published along with mine establishing *Cosila* (*Cosilella*) *plutonis* Banks as a synonym of *anthracina* Ashmead. I quote: "Knowing that Dr. Bradley had established the generic identity of *Telephoromyia anthracina* Ashmead and the genus *Fedtschenkia* Saussure, the writer suspected that *Cosillela* was another synonym of *Fedtschenkia,* and by examining the type of the above species in Washington, this suspicion was readily confirmed." He noted extension of the range to Colorado and Washington. At the same time Mr. Dow suggested witholding publication until specific identity of *anthracina* and *plutonis* could be confirmed by examination of Bank's type in New York.

Dr. Pate subsequently [2] had opportunity to make such examination and in 1946 quite correctly established that synonymy, as well as that of *Telephoromyia.*

In 1947, in the paper on Sapygidae referred to in the first footnote, Dr. Pate adequately characterized the genus and the subfamily Fedtschenkiinae, which he there erected.

The only reason for publishing the preceding material is to confirm Dr. Pate's conclusion as to the identity of *Telephoromyia* with *Fedtschenkia.* Since Dr. Pate has never seen a specimen of any Asian species of that genus, but based his conclusions on literature, it is desirable to confirm them from knowledge of actual specimens. I also feel that I owe it to Mr. Dow (since his paper was in my custody) that he should share the credit for synonymizing *Cosilella* with *Telephoromyia.* Dr. Pate doubtless was not familiar with Dow's views.

[2] The generic names of the Sapygidae and their type-species. Ent. News, 1946, 57: 219–221.

In passing, it may be as well to call attention to the fact that the Coalinga♀ of *Fedtschenkia anthracina* (Ashm.) recorded by Dr. Pate ('47, p. 402) along with several others collected by me at the same time and place were given by me to the Cornell University Collections and that all specimens of Dr. Pate's new genus *Huarpea* which he had seen, namely those of *H. burmeisteri* (Gerst.), *H. fallax* (Gerst.) and *H. wagneriella* (du Buysson) belong to the Cornell University Collection, the latter having been collected by the Cornell University Entomological Expedition to South America, of 1919–20, on which I was accompanied by the late Dr. R. Gordon Harris (not R. C. Harris) the collector. These facts do not appear in Dr. Pate's paper, although the location of all other material is given. It may be useful to future students to know where this material is located.

There remains one further matter of synonymy: I have examined the type of *Plesia* (*Myzine*) *nigropilosella* Cameron in the British Museum and find it to be another synonym of *Fedtschenkia anthracina* (Ashmead). Krombein (Trans. Amer. Ent. Soc., 1938, 64: 291) placed it doubtfully in *Fedtschenkia* and suggested that it might be a synonym of *anthracina* Ashm.

Since Dr. Pate's 1947 paper is in a serial not ordinarily available in this country, it will be worthwhile to give here characters by which Sapygidae may be recognized and those by which I had separated the two subfamilies. Dr. Pate has added others.

## Family Sapygidae

Sixth sternum of the ♀ expanded laterally and dorsally, its edges wrapping around each other on the dorsal surface of the insect where they lie very intimately imbricated, and projecting like a seventh segment beyond the sixth tergum. Until one discovers the line of overlap on the dorsal surface of these extended sides of the sixth sternum, it appears as though the seventh had so fully fused with its sternum as to leave no trace of union, so that the two formed a hollow cone enclosing the sting which issued from its tip. This very extraordinary arrangement was pointed out by Dr. George Arnold. It occurs in no other vespoid wasps, and makes the Sapygidae very easily recognizable.

*Key to the Subfamilies of Sapygidae*

Eyes entire; antennae not inserted beneath frontal carinae; legs of ♀ spiny, fossorial ..... Fedtschenkiinae
Eyes emarginate; antennae inserted beneath frontal carinae; legs not spiny. Parasites in the nests of bees. .... Sapyginae

The synonymy of our only North American species will remain as given by R. M. Bohart,[3] with the additions noted.

**Fedtschenkia** Saussure

**anthracina** (Ashmead). Wash., Cal., Col., N. Mex.
*Telephoromyia anthracina* Ashmead, 1898.
*Plesia* (*Myzine*) *nigropilosella* Cameron, 1908. Trans. Amer. Ent. Soc., 34: 237, ♀.
*Cosila plutonis* Banks, 1913.

In addition to material already recorded, there is a ♀ in the U. S. N. Museum from Wawawai, Washington, collected 7/9 by C. V. Piper and one in the Baker Collection, U. S. National Museum, from Arboles, Colorado on *Salix*.

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## North American Muscoidea (Diptera: Tachinidae) [1]

By H. J. Reinhard, College Station, Texas

The four new species described below were encountered in materials received for identification from several different sources as specified under the descriptions. The types, except as indicated, are retained by permission in my collection.

**Xanthomelanodes trivittata,** new species

A small species with a wide front which traces to *X. californica* in Sabrosky's key (Jour. Wash. Acad. Sci., 40: 363) but is readily distinguished from the latter and all other known

[3] Hymenoptera of American north of Mexico. Synoptic catalog 1951, p. 777.

[1] Contribution No. 2229, from the Department of Entomology, Texas Agricultural Experiment Station.

species by the unicolorous black femora and distinctly vittate mesonotum.

Male. Black in general aspect with only the sides and venter of abdominal segments one and two and the genitalia distinctly reddish yellow; one weak black bristlet beneath each vibrissa; parafrontal grayish pollinose, narrowed above but attaining vertex; latter 0.28 of head width; wholly black third antennal segment hardly longer than second which is reddish in ground color, palpus red tipped with black. Thorax lightly gray pollinose on dark background, notum with three broad velvety black vittae, which extend halfway or more to base of scutellum, the intermediate pale or pollen vittae much narrower but distinct along entire dorsocentral row; prescutellar area densely pollinose; postnotal slope inconspicuously setose; three sternopleural bristles. Legs black, coxae and trochanters obscurely reddish; claws and pulvilli about equal length of apical tarsal segment. Wing smoky on coastal half becoming paler towards hind margin; first posterior cell closed to barely petiolate at exact wing tip; cubitulus very broadly or gently bowed; epaulet black; calypter semitransparent white to slightly tawny; genital segments yellow; forceps broad and flattened behind basally, suddenly narrowed near middle thence moderately produced as a slender recurved blunt-tipped beak. Female unknown.

Length, 6 mm.

*Holotype* male, "15 km. N. of Chapalilla, Nay., MEX., 19 July 1951, Baccharis, P. D. Hurd."

**Phasiomyia meliceris,** new species

Readily distinguished from *P. splendida* (genotype), by the larger build and wholly reddish yellow abdomen.

Male. Vertex barely wider than ocellar triangle, front at narrowest subequal width of same but diverging rapidly forward to level of antennal base; parafrontal blackish, gray pollinose, clothed with numerous erect black hairs; frontalia black, wider than parafrontal on upper half; frontal bristles barely differentiated from adjacent hairs, stopping above antennal base; ocellars and verticals weak or hairlike; epistoma very promi-

nent or conelike in profile, as long as clypeus; vibrissal angles beset with two or three short bristly hairs and several setae immediately above; antennal bases well separated, first segment flush, ovate third segment but little longer than second, wholly black; arista black, bare, moderately thickened on basal two-fifths, middle segment short but distinct; frontal lunule polished black; broad parafacial transversely dished, plumbeous with paler background apparent on inner margin below vibrissal level; cheek sparsely pale-haired, black with a broad pale yellow vitta extending from middle of oral cavity nearly to lower edge of eye; latter bare; proboscis moderately slender, shorter than head height; palpus yellow, slender with tip slightly swollen; occiput flat, thinly gray pollinose, with a vestiture of rather short black hairs intermixed with paler ones on lower part.

Thorax velvety black, mesoscutum with a defined prescutellar subquadrate patch of golden pollen, which tapers anteriorly and almost reaches transverse suture, besides a smaller lateral vitta of paler or grayish pollen; pleura thinly gray pollinose, clothed with whitish hairs; one (posterior) sternopleural bristle; scutellum black, lightly dusted with whitish pollen. Legs subshining black, femora clothed with pale hairs and bristles ventrally and black ones dorsally; claws and pulvilli about equal to combined length of last two tarsal segments. Wing with anal area considerably enlarged, pale yellow near base tinged with brown along veins in costal half and paler on hind margin; apical cell closed with long petiole ending in extreme wing tip; calypters wide, transparent tawny.

Abdomen broadly ovate and flattened above, surface of three basal segments shiny, fourth with opaque yellowish pollen except on narrow basal margin; without any differentiated bristles, the vestiture of black hairs short and appressed; hypopygium ventral, brownish black; sternites exposed. Female unknown.

Length, 11 mm.

*Holotype:* University of British Columbia Campus, Vancouver, BRITISH COLUMBIA, October 16, 1950 (R. O. Dunsmore) in the British Columbia University Collection. *Paratype:* 1 male, "North Van. 29-IX-1948 G. A. West."

**Hemyda zonula,** new species

Abdomen more constricted basally than in *H. aurata* (genotype); sides of postnotum beneath calypters bare; tarsi reddish and concolorous with tibiae.

Male. Eye bare, reaching from lower edge of head to well above level of vertex, rather deeply emarginate near middle of hind margin; frontalia except on lateral margins polished or shining black; front at vertex 0.18 of head width; parafrontal yellow pollinose, strongly narrowed before vertex; frontal bristles weak, descending slightly below antennal base; inner verticals and ocellars weak or hairlike; facialia bare, narrow, shining black; vibrissae reduced to small hairs, far below median level of oral margin; parafacial bare yellow pollinose; antenna as long as face, blackish, third segment about three times length of second; arista yellowish on thickened basal half, blackish and micro pubescent beyond middle, second segment moderately elongate; cheek sparsely pale-haired, linear in profile; proboscis short, labella large and fleshy; palpus brown thickened tip paler or yellowish; occiput clothed with pale hairs.

Thorax subshining black, scutellum reddish apically, with pale yellowish pollen appearing denser on transverse suture, sternopleuron, humerus and on prescutum as two vague vittae which taper rearward and fade out before attaining suture; anterior acrostichal bristles not developed, prescutellar pair distinct; post dorsocentrals 3; notopleurals 2; presutural 1 (outer); sternopleural 1 (hindmost); scutellum with 2 lateral and 1 decussate apical, no discals; prosternum and propleuron bare.

Legs reddish yellow becoming blackish basally, moderately elongate; claws pale yellow with brown tips, subequal to length of last two tarsal segments, pulvilli about as long as claws.

Wing rather narrow and long, extending well beyond tip of abdomen, blackish on costal third, subhyaline or grayish behind; first poterior cell narrowly open a trifle before wing tip; cubitulus obtusely rounded without fold or stump; third vein with two or three minute hairs near base; costal spine not developed; epaulet blackish; calypters rather small, transparent but with a uniform tawny tinge.

Abdomen black in ground color, constricted part of first principal segment transparent white except along median line above, narrow basal margin of second segment also pale in background, two apical segments thinly dusted with gray pollen; weak median marginal bristles on all except anal segment; genitalia yellowish, forceps soft in texture, triangular as viewed from behind, accessory process considerably longer than forceps, broadly rounded at tip; apical sternites exposed.

Female. Similar to male except for sexual differences; genitalia as in *aurata,* composed of a pair of sclerotized anal forceps with tips of latter apposed to the divergent arms of a characteristic Y-shaped process situated near middle of ventral surface of apical sternite, piercer small, slender or needle-like.

Length, male, 10 mm; female, 7.5 mm.

*Holotype* male and *allotype* female (on same pin), Orizaba, Mexico, 2500 ft., November 13, 1954 (R. R. Dreisbach), in the U. S. National Museum.

**Cylindromyia sternalis,** new species

This species is almost like *C. limbata* Aldrich (Proc. U.S.N.M., 68: 25), but is larger, has predominantly black legs and wholly pale-haired cheeks; the shape and vestiture of the fifth sternite differs markedly from all known allied species.

Male. Head pale yellowish pollinose occiput and posterior orbit gray to cinereous; antenna reddish nearly to or below arista, third segment narrower than parafacial; frontalia pale brownish, hardly narrowed towards vertex; latter 0.27 of head width; ocellars weak and divaricate; parafrontal devoid of any vestiture outside of frontal row; cheek about one-seventh eye height.

Thorax gray pollinose on dark background which shows a slight but distinct metallic tinge on notum; latter vittate in front of suture, less distinctly so behind; scutellum concolorous with notum bearing two lateral bristles and one decussate apical pair; sternopleurals three. Wing infuscate around first posterior cell, including hind cross vein and about apical third of second, costa yellow from base to apex of first vein; epaulet black, subepaulet

red. Claws and pulvilli nearly equal combined length of last two tarsal segments; hind trochanter bearing a cluster of stubby recurved bristles on inner apical margin, not very conspicuous.

Abdomen largely black sides more or less reddish to brown; incisures of intermediate segments silvery pollinose; one pair of median marginal bristles on segments one and two and a marginal row of six to eight stoutish bristles on segment three and four; genitalia reddish yellow, forceps and accessory process sclerotized; fifth sternite with an extremely wide excision reducing lobes to a narrow rim which is beset with short bristly hairs and stubby spines except on anterior median third which is devoid of any vestiture. Female unknown.

Length, 13–14 mm.

*Holotype* male, Ahuacatlan, Nay., MEXICO, July 18–22, 1951 (P. D. Hurd). *Paratype*, 1 male, "El Salto, MEX., Aug. 24, 1942."

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## Smithsonian Institution Receives Bromley Collection

The **Stanley W. Bromley Collection**, consisting mostly of Diptera, contains well over 35,000 specimens nearly 28,000 of which are "robber-flies" (Asilidae). Of this number 868 individuals are type specimens. Among the types are many of Wilcox, Martin, and Cole, as well as those of Bromley. This collection is world-wide in scope containing excellent representations from South America, Africa, Europe, Indo-Malaya, Australia, New Guinea, New Caledonia, and China. There are about 20,000 specimens from North America. This acquisition gives the Smithsonian Institution one of the foremost collections in this group.

The late Dr. Bromley, formerly with the Bartlett Tree Research Laboratories, Stamford, Connecticut, spent a lifetime assembling this material and devoted much time to collecting the prey as well as the predator flies. His publications on Asilidae, of which a complete set came with the collection, were many.

# A Note on the Nomenclature and Taxonomy of the Subgenus Proscirtothrips Karny (Thysanoptera: Thripidae)

By KELLIE O'NEILL, Entomology Research Branch, Agricultural Research Service, United States Department of Agriculture

The purpose of this note is to clarify the status of *Proscirtothrips*. This subgenus includes those species of the genus *Anaphothrips* Uzel that are characterized by a simple sense cone on the third antennal segment and a forked sense cone on the fourth antennal segment, a regular division of the antenna into nine segments, and a straight wing fringe. Macropterous forms have the first dorsal seta of abdominal segments 2 to 8 in a distinctive position, approximate on the anterior segments and becoming larger and farther apart posteriorly, and males have no glandular areas on the venter. As thus defined the subgenus is limited in distribution to western North America.

**ANAPHOTHRIPS (PROSCIRTOTHRIPS)** Karny

*Scirtothrips* (*Proscirtothrips*) Karny, 1921, Treubia 1 (4): 237.
*Scirtothrips* (*Proscirtothrips*) Karny, Watson, 1923, Fla. Agr. Expt. Sta. Bul. 168: 32–33.
*Anaphothrips* (*Odontanaphothrips*) Moulton, 1926, Pan-Pacific Ent. 3: 24–25. New synonymy.
*Anaphothrips* (*Proscirtothrips*) Karny, Watson, 1927, Fla. Ent. 11: 29–30, 42.
*Scirtothrips* (*Proscirtothrips*) Karny (in part), Priesner, 1932, Bul. Soc. Roy. Ent. d'Egypte 16: 152.
*Anaphothrips* (*Proscirtothrips*) Karny, Priesner, 1949, Bul. Soc. Fouad 1er Entom. 33: 139.
*Odontanaphothrips* Moulton, Priesner, 1949, Bul. Soc. Fouad 1er Entom. 33: 139.

Karny used the name *Proscirtothrips* in 1921 for a subgenus of *Scirtothrips* Shull that he distinguished from the nominate subgenus in a key, without including species. Species were first included in *Proscirtothrips* in 1923, when Watson placed in it *Anaphothrips zeae* Moulton, 1911; *Anaphothrips tricolor* Moulton, 1911; *Anaphothrips longipennis* Crawford, 1910; and,

in the synonymy of *A. longipennis, Euthrips parvus* Moulton, 1911. The inclusion of *E. parvus* was an accident due to the confusion of *Scirtothrips longipennis* (Bagnall), of which *parvus* is a synonym, with *A. longipennis* (Crawford) (Hood, Proc. Ent. Soc. Wash. 16: 37, 40, 1914). Watson omitted *parvus* in 1927, when he removed *Proscirtothrips* from *Scirtothrips* and placed it as a subgenus of *Anaphothrips*, retaining *zeae, tricolor,* and *longipennis* Crawford, and adding a new species, *monotropae.* In 1932 Priesner, retaining *Proscirtothrips* as a subgenus of *Scirtothrips* in his account of that genus, included only *A. longipennis* Crawford, which he renamed *S. crawfordi,* and *A. antilope* Priesner, which he designated type. As *A. antilope* was not originally included, it cannot serve as type. More recently (1949) Priesner accepted the assignment of *Proscirtothrips* to *Anaphothrips* and designated *A. zeae* as its type.

*Odontanaphothrips* was erected by Moulton in 1926 as a subgenus of *Anaphothrips* for *A. tricolor,* which he designated type, and a new species, *enceliae.* It was raised to a genus by Priesner in 1949, but its type species agrees with that of *Proscirtothrips* in all the characteristics of the definition given above, and has an additional similarity in having setae of normal size on the ninth tergum of the male instead of the four thornlike setae more usual in *Anaphothrips* species. The principal differences are the presence in *Proscirtothrips* only of apterous forms that lack the distinctive first dorsal abdominal seta, and the presence in *Odontanaphothrips* only of coarse dentition on the posterior margins of abdominal segments, complete combs being formed on the seventh and eighth segments. With the view that more will be gained from recognizing the similarity of these taxons than from distinguishing between them, *Odontanaphothrips* is here reduced to a synonym of *Proscirtothrips.*

The species of *Proscirtothrips* that so far have been recognized are given below.

**Anaphothrips (Proscirtothrips) zeae** (Moulton)

*Anaphothrips longipennis* D. L. Crawford, 1910, Pomona Jour. Ent. 2: 150–152, fig. 62 [Not *Euthrips longipennis* Bagnall, 1909].

*Anaphothrips zeae* Moulton, 1911, U. S. Dept. Agr., Bur. Ent., Tech. Ser. 21: 28, 41, pl. 4.
*Scirtothrips longipennis* (Crawford), Karny, 1912, Zool. Annal. 4: 334.
*Scirtothrips zeae* (Moulton), Karny, 1912, Zool. Annal. 4: 334.
*Scirtothrips* (*Proscirtothrips*) *longipennis* (Crawford), Watson, 1923, Fla. Agr. Expt. Sta. Bul. 168: 33.
*Scirtothrips* (*Proscirtothrips*) *zeae* (Moulton), Watson, 1923, Fla. Agr. Expt. Sta. Bul. 168: 33.
*Scirtothrips* (*Proscirtothrips*) *crawfordi* Priesner, 1932, Bul. Soc. Roy. Ent. d'Egypte 16: 152. [New name for *Anaphothrips longipennis* Crawford.]
*Anaphothrips* (*Proscirtothrips*) *longipennis* (Crawford), Watson, 1927, Fla. Ent. 11: 42.
*Anaphothrips* (*Proscirtothrips*) *zeae* (Moulton), Watson, 1927, Fla. Ent. 11: 42.
*Anaphothrips* (*Hemianaphothrips*) *zeae* (Moulton), Priesner, 1932, Bul. Soc. Roy. Ent. d'Egypte 16: 155.
*Anaphothrips longipennis* Crawford, Bailey, 1944, Pan-Pac. Ent. 20: 86, pl. 1.

When Bailey showed in 1944 that *zeae* Moulton 1911 was a synonym of *longipennis* Crawford 1910, he overlooked the rejection of *longipennis* as a homonym (Priesner 1932), so that *zeae* once more becomes available as the first available synonym. The subgenus *Hemianaphothrips* Priesner (Österr. Ent.-Ver. Ztschr. 10: 5, 1925, type *articulosus* Priesner), by virtue of its later date, is not involved in the nomenclature of *Proscirtothrips*.

**Anaphothrips (Proscirtothrips) tricolor** (Moulton)

*Anaphothrips tricolor* Moulton, 1911, U. S. Dept. Agr., Bur. Ent., Tech. Ser. 21: 28, 41, pl. 5.
*Scirtothrips tricolor* (Moulton), Karny, 1912, Zool. Annal. 4: 334.
*Scirtothrips* (*Proscirtothrips*) *tricolor* (Moulton), Watson, 1923, Fla. Agr. Expt. Sta. Bul. 168: 33.
*Anaphothrips* (*Odontanaphothrips*) *tricolor* (Moulton), Moulton, 1926, Pan-Pac. Ent. 3: 24.
*Anaphothrips* (*Proscirtothrips*) *tricolor* (Moulton), Watson, 1927, Fla. Ent. 11: 42.
*Anaphothrips tricolor* Moulton, Priesner, 1932, Bul. Soc. Roy. Ent. d'Egypte 16: 152, 155.
*Odontanaphothrips tricolor* Moulton, Priesner, 1949, Bul. Soc. Fouad 1er Entom. 33: 139.

Priesner noted in his 1932 work on *Scirtothrips* that this species belongs in a special subgenus of *Anaphothrips*.

**Anaphothrips (Proscirtothrips) enceliae** (Moulton) n. comb.

*Anaphothrips* (*Odontanaphothrips*) *enceliae* Moulton, 1926, Pan-Pac. Ent. 3: 24, fig. 7–9.

The description of this species from a single female invites the question whether it is a teneral example of *tricolor*.

The following species that have been placed in *Proscirtothrips* do not belong there.

**Scirtothrips antilope** (Priesner)

*Anaphothrips antilope* Priesner, 1923, Ent. Mitt. (Berlin) 12: 63.
*Scirtothrips* (*Proscirtothrips*) *antilope* (Priesner), Priesner, 1932, Bul. Soc. Roy. Ent. d'Egypte 16: 141, 152.
*Scirtothrips antilope* (Priesner), Priesner, 1939, Bul. Soc. Fouad 1er d'Ent. Bul. 22: 119.

This species owes its specific name to the long, slender projections from the ninth tergum of the male that are characteristic of *Scirtothrips* species.

**Pseudothrips monotropae** (Watson) n. comb.

*Anaphothrips* (*Proscirtothrips*) *monotropae* Watson, 1927, Fla. Ent. 11: 29–30.

This species has the forked sense cones on both third and fourth antennal segments, the wavy wing fringe, the long, close-set comb on the eighth abdominal tergum in both sexes, the pair of long, dark spines followed by a pair of small, pale spines on the ninth male tergum, and other characteristics of *Pseudothrips inaequalis* (Beach), the type of *Pseudothrips*. As Watson noted, it also has the peculiar resemblance of *P. inaequalis* to *Frankliniella bispinosa* (Morgan). Four slides of the type series were studied, being made available through the courtesy of Dr. A. N. Tissot of the University of Florida.

# Concepts of Insect Taxonomy in Ancient India *

By R. N. SINHA AND D. SHANKARNARAYAN, Department of Entomology, University of Kansas, Lawrence, Kansas

A review of the books on history of biology by noted writers such as Locy (1915), Nordenskiold (1928), Bodenheimer (1928) and others, reveals that there has been no mention made of the concepts which the ancient Hindus had developed in the fields of natural sciences, particularly in zoology and entomology. The Hindus have had a share in the work of constructing scientific concepts and methods of investigation of biological phenomena. Hindu scientific ideas and methodology have made considerable contributions to the understanding of the philosophy of nature. The general assumption among the bio-historians in the west is that the learned men in the orient scarcely contributed to the growth of biological sciences. Nordenskiold (1928), for example, says "The civilized people of eastern Asia, the Hindus and Chinese, have contributed very little of importance to the development of the science of biology." There is adequate proof that systematic investigations in the realm of biology started nearly two centuries before Aristotle. The main reason for their obscurity to the later biographers and historians of the west can possibly be attributed to the lack of enthusiasm to learn Sanskrit, the classical Indian language, a medium in which almost all scientific work was recorded in those days.

An attempt is made here to present some of the taxonomic concepts of ancient India in comparison with contemporary developmental stages in the west.

The earliest known classification of animals dates back to 600 B.C. when CHARAKA laid the foundations for the biological sciences. He occupies the same place of honor as Aristotle in the occidental philosophy (Aristotle, 384–322 B.C.). His classification of animals, formulated nearly two centuries before Aristotle, took as its basis the nature of the origin of

* Contribution No. 903 from the Department of Entomology, University of Kansas.

animals. On this criterium he divided the animal kingdom into four major groups:

CHARAKA'S CLASSIFICATION.

1. *Jarayuja:* Born from the uterus; e.g. man and other placental mammals.
2. *Andaja:* Born of an egg; e.g. fishes, reptiles, and birds.
3. *Svedaja* or *Usmaja:* Born of moisture and heat; spontaneously originated; e.g. worms, mosquitoes.
4. *Udvija:* Born of vegetable matter.

PRASASTAPADA (500 B.C.), who followed Charaka, developed a different classification, as follows:

1. *Ayonija:* Asexual animals, minute in size, more than a hundred in a handful, without bones, without their own blood, and not easily crushed. This category includes all animals up to the size of Nakula (*Ichneumon*) *"Nakula paryantha kshudrajanthava."*
2. *Yonija:* Sexual animals; born through the union of sperm and ovum:
   A) *Jarayuja:* born out of uterus; with placenta: placental mammals.
   B) *Andaja:* Oviparous: e.g. birds, reptiles. (The term, 'Sarisrupas' includes reptiles, birds, fishes, and insects.)

PATANJALI, a Hindu chemist of second century B.C. who was well versed in biology as well, classified animals on the same characters.

SUSRUTHA (100 A.D.) more or less followed the classification of Charaka and developed the famous 'Susrutha school.' His two great works in Sanskrit language, 'Kalpasthana' and 'Suthrastana,' mention (i) six varieties of ants, (ii) six varieties of flies, (iii) five varieties of mosquitoes, (iv) eight varieties of centipedes, (v) thirty varieties of scorpions and (vi) sixteen varieties of spiders. He classified the insects into:

a) *Krimi:* arising from moisture, faeces, and from decomposing dead bodies
b) *Kitas:* venomous insects and also large scorpions
c) *Pipilicas:* ants, mosquitoes, gnats, and the like insects.

UMASVATHT. The best of the more detailed classifications was developed between first century B.C. and first century A.D. by Umasvathi, a Jaina biologist, who in her work 'Tatthvarthedhigama,' recorded an entirely new classification of animals. It is a good instance of classification by series, the number of senses possessed by the animal being taken to determine its position in the series. Perhaps only senses actively determining the life-habits were considered.

Division I. Animals with two senses: Touch and taste (as evidenced by contractility and selection or rejection of food).

a) *Apadika:* (Vermes without lateral appendages)
b) *Nupuraka:* (Annulated with pendants, worms with unsegmented lateral appendages, Annelids)
c) *Gandupada:* (Knotty-legged: Arthropoda, including Crustacea, Myriopoda etc.)
d) *Sankha:* (Some forms of Mollusca: conical gastropods)
e) *Sambuka:* (*Helix*)
f) *Suktika:* (Pearl-mussel, Lamellibranchates)
g) *Jaluka:* (Leeches)

Division II. Animals with three senses, touch, taste, and smell.

a) *Pipilika:* ants (Hymenoptera: Formicidae)
b) *Rohinika:* red ants (Hymenoptera: Formicidae)
c) *Upachika, Kunthu, Tuburaka:* Bugs and fleas (Hemiptera, Hemimetabola)
d) *Trapusavija* and *Karpasasthika:* Cucumber and cotton weevils and lice.
e) *Sathapadi* and *Uthpataka:* Spring-tails.
f) *Trinapatra:* Plant-lice.
g) *Kastha-haraka:* Termites, white-ants and ant-lions.

Division III. Animals with four senses: Sight, smell, taste, and touch.

a) *Bhramara:* Bees.
b) *Varatha:* Wasps.
c) *Saranga:* Hornets.
d) *Maksika:* Flies.
e) *Puttika:* Gnats.
f) *Dansa:* Gad-flies.
g) *Masakas:* Mosquitoes.

h) *Vrischika:* Scorpions.
i) *Nandyavartha:* Spiders.
j) *Kita:* Butterflies and moths.
k) *Pathanga:* Grasshoppers and locusts.

Division IV. Animals with five well-developed senses.

a) *Matsya:* Fishes.
b) *Uraga:* Amphibians (Legless ones).
c) *Bhujanga:* (Crawl or run on the chest) Snakes.
d) *Pakshi:* (With wings) Birds.
e) *Chatuspada:* (Four-limbed) Quadripeds and man.

It is thus seen that the first three divisions comprise the Invertebrata and the last is identical with the Vertebrata.

DALVANA, a biologist and commentator on Susrutha's works, was a great authority on insects and he employed the following criteria for insect classification:

(a) dotting or marking, (b) wings, (c) pedal appendages, (d) mouth, with antennae or nippers, (e) claws, (f) sharp, pointed hairs or filaments, (g) stings in the tail, (h) nature of wings, (i) humming or other noise, (j) size, (k) structure of the body, (l) genitalia and (m) poison and its action on bodies.

The following chart pictures the stages of development of biological concepts in the East in early days as compared with the contemporary stages in the West.

| Period | Scientists in India | Remarks | Scientists in the West | Remarks |
|---|---|---|---|---|
| 600–500 B.C. | CHARAKA | Father of oriental medicine and biology | — | — |
| 500–400 B.C. | PRASASTAPADA | — | — | — |
| 400–300 B.C. | — | — | HIPPOCRATES | Father of Natural history |
| | | | ARISTOTLE | Father of Natural history |
| 300–200 B.C. | PATANJALI | | — | — |
| 200–100 B.C. | — | — | — | — |
| 100–0 B.C. | — | — | PLINIUS, THE ELDER | |
| 0–100 A.D. | UMASVATI | First detailed classification of insects | — | — |
| 100–200 A.D. | SUSRUTHA | Established the school of biology | — | — |
| | LADYAYANA | Insect specialist | — | — |
| | DALVANA | Insect specialist | — | — |

It is thus seen that the biological lore of the ancient Hindus is in all respects a good document of their general scientific interest. Some of their classifications were no less remarkable than that of Aristotle. As B. K. Sarkar (1918) rightly points out, "The story of scientific investigation among Hindus is thus, like that among other nations, the story of a growth and development in critical enquiry, sceptical attitude, and rationalism. Historically speaking, superstition has not had a deeper and more extensive hold on the Oriental intellect than on the Occidental."

Many original works in Sanskrit are available in India, England, and Germany. An extensive study of the entomological and zoological materials in these works would be rewarding. Our information, however, comes from the compilations of SEAL (1915) and SARKAR (1918), from whom the classifications detailed above were obtained.

The authors express their thanks to Dr. Charles D. Michener, Chairman, Department of Entomology, University of Kansas, Lawrence for his encouragement and helpful criticism in preparation of this manuscript.

SOURCES IN SANSKRIT

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SRIDHARA. ? B.C. Kandali.
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# Report of Another European Chilopod in Eastern North America (Chilopoda: Geophilomorpha)

By Ralph E. Crabill, Jr., Department of Biology, Saint Louis University

It is known now that some of our commonest North American soil inhabitants have been introduced from other parts of the world, particularly from Europe. That this is not less true in the Chilopoda than in certain other invertebrate groups is now becoming increasingly apparent. For example, *Scutigera coleoptrata* (Linné), *Lithobius forficatus* (Linné), *Necrophloeophagus longicornis* (Leach), and *Cryptops hortensis* Leach all are European centipedes which have become established (and in the first two cases widespread) in eastern North America. To this growing list now may be added another interloper, *Chaetechelyne vesuviana* (Newport), a geophilomorph previously known only from warmer Europe.

Characteristically southern, this species' range includes Normandie, the Pyrenees, numerous localities in the Tyrol, northern penninsular Italy with its adjacent Ligurian and Istrian coasts, Hungary, Romania, and coastal Jugoslavia. It has also been recorded from the Mediterranean islands of Sicily, Corsica, Sardinia, Elba, and Palma as well as from the North African ports of Tunis and Algiers. Such a distribution suggests repeated, successful introductions in the Old World.

The present report is based upon twenty-four specimens collected at Rochester, New York, by Dr. W. B. Muchmore of the University of Rochester who generously sent them to me for identification. Considering their number together with the facts that specimens of both sexes and of various ages (some extremely young) are represented, one is inclined to the view that Dr. Muchmore sampled an established population that had lived in the area for a number of years.

Dr. Muchmore writes that the majority were found under ties and pieces of wood along the Lehigh Valley Railway tracks but that a few were discovered under debris in a trash pile in

the Mount Hope Cemetery. These two sites have been sèparated by a busy six-lane highway for the past twenty-five years. Furthermore, Dr. Muchmore was able to ascertain that a flourishing nursery had been located just east of the cemetery during the latter half of the past century and until the first World War. This nursery, which is known to have imported much of its material from Europe, was an important source of supply for the Mount Hope Cemetery. In the face of this evidence both Dr. Muchmore and I consider it not unlikely that *vesuviana* was introduced into the area some time ago, probably before the third decade of this century. The possibility of its long residence in the Rochester region is not necessarily precluded by the absence of previous reports nor even by the repeated surveys to which the Ithaca area, some ninety miles to the southeast, has been subjected successively by R. V. Chamberlin, J. W. Bailey, and myself. In the first place, virtually nothing is known of the chilopods of northern New York State; and secondly, Rochester lies in a narrow corridor representing an eastern extension of the midwestern Upper Austral Zone. Consequently it enjoys a somewhat milder climate than adjacent regions to the east and south. Perhaps such ecological preferences have inhibited the species' wider dispersal in the state.

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## Entomological Departments

Believing such material to be of interest to its readers, ENTOMOLOGICAL NEWS herewith solicits articles similar to the one here presented and giving information on the organization and activities of entomologists in colleges, universities, museums, and in government and other groups.

### The Ohio State University

The Department of Zoology and Entomology offers opportunities for study and research in several fields of animal and human biology, leading to the Master of Science, Master of Arts, or to the Doctor of Philosophy degree.

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An important phase of the training in entomology lies in the opportunities of advanced students for either part time or full employment at the Ohio Agricultural Experiment Station at Wooster, Ohio. Qualified students may work on research projects in field studies for pay and for credit, thus furnishing opportunity for actual field experience under the direction of competent and experienced field entomologists.

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Insect Control:
Biological Control.....ALVAH PETERSON
Animal Pests, Plant Pests, Stored Product Pests } R. H. DAVIDSON, D. M. DELONG, F. W. FISK, CARL VENARD, ALVAH PETERSON
Insects in relation to animal diseases.....CARL VENARD
Insects in relation to plant diseases.....
R. H. DAVIDSON, D. M. DELONG
Insect Ecology.....D. J. BORROR, D. M. DELONG

Insect embryology and morphology.....
D. J. BORROR, F. W. FISK
Insect physiology and toxicology.....F. W. FISK
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Further information, including a brochure and blanks for assistantships may be obtained by writing to the Secretary of the Department.—D. F. MILLER, Chairman.

# EXCHANGES

**This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.**

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

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**Conopidae** of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

**Anisoptera**—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleigh, N. C.

**Bembicini and Stizini** (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

**Agapema galbina.** Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

**Wanted**—Data on exact location of colonies of *Epibembex* (olim *Bembix*) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

**Fanniinae** wanted on loan (nearctic and holarctic), and information on collections. James G. Chillcott, Dept. Entom., Univ. of Kansas, Lawrence, Kan. (Loans may be charged to Dr. C. D. Michener.)

**Tenebrionidae** of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral. San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

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